THE PHYSICAL EDUCATION INSTRUCTIONAL MODEL BASED ON ACTIVE LEARNING WITH VIDEO MODEL TO PROMOTE TEACHING SKILL AND PERSONAL AWARENESS OF TEACHING THAI TRADITIONAL SPORTS FOR STUDENT TEACHERS

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Abstract: The purposes of this research were to study the teaching components and creating a teaching model of Physical Education based on proactive learning with video model in order to promote teaching skill and personal awareness of Thai traditional sports and to study the results of using teaching models based on proactive learning with video model in order to promote teaching skill and personal awareness of Thai traditional sports for student teachers. The research samples consisted of 60 students from the Faculty of Education, Chulalongkorn University, who enrolled in subject 2723319, Child Movement Activity of Health and Physical Education Curriculum. The researcher randomly used 30 samples each into an experimental group and a control group. The research instruments were 6 tools 1) video model, 2) lesson plan, 3) teaching evaluation form, 4) awareness assessment form, 5) student's behavior observation form, and 6) questionnaire on using developed model. The data were analyzed by descriptive statistic and t-test using SPSS program. The findings of this search :(1) There were 5 teaching components of Physical Education based on proactive learning with video model in order to promote teaching skill and personal awareness of Thai traditional sports for student teachers. (2) There were 7 steps of teaching format of Physical Education based on proactive learning with video model in order to promote teaching skill and personal awareness of Thai traditional sports for student teachers. (3) The learners who learned Physical Education based on proactive learning with video model in order to promote teaching skill and personal awareness of Thai traditional sports statistically had higher skill than before at .05 level. (4) The learners who learned Physical Education based on proactive learning with video model became more aware in teaching Thai traditional sports than those who learned with normal method at .05 level.

Keywords: The Physical Education Instructional Model**,** Active Learning, Video Model, Teaching Skill, Personal Awareness of Teaching

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Introduction

Thai traditional sports and folk games have been around for a long time. In the past there were a variety of traditional Thai recreational activities that one could choose from. However, in modern times these traditional games and sports have been overshadowed by international sports, games and video games; leaving the younger generation unaware of their existence. Traditional Thai recreational activities are heavily influenced by the area in which they originated from and the knowledge of these games are normally passed down from generation to generation. These traditional activities can be a great way for children to relax and learn about themselves, their environment and their culture. Like other sports, traditional Thai sports can be physically and mentally challenging.

Thus allowing the player(s) to improve their physical strength as well as fine tune their mental performance and social skills. (Chatchai Komaratat, 2006). The main purpose of teaching Physical Education at elementary level is not merely to teach the students about movement, sports skills or the benefits of exercise but to instil a set of principles in which the student can continue to abide by in later life; things like unity, sportsmanship, leadership and sensibility. Furthermore, Physical Education aims to give the students the opportunity to feel a sense of inclusivity and enhance their sense of discipline. The activities organized for Physical Education focus on the development of 5 performance aspects, which include physical, mental, emotional, social and intellectual aspects. However, it is of the author's opinion that activities to strengthen and develop the learners to be thoughtful, logical and systematic should also be considered and adopted into the lessons. It is the duty of the educator to be an example to their students and instil a set of values they can aspire to. As the students are at an impressionable age, the educator is in a position of great influence over the students. Therefore, the educator must be knowledgeable, ethical and inspirational. With the rapid changes within our society in the 21st century, especially in terms of technology, it is highly important for the educator to keep up with information technology. Using IT in Physical Education as part of classroom activities can be an efficient way for the educator to communicate across ideas and pass on knowledge to young learners. Moreover, it increases the level of student interest in the subject or topic at hand. Another way of improving an educator's teaching is to utilize 'Active Learning' methods. This will allow students to have more involvement in the class. Instead of being a receiver of information, they become part of the learning process, leading to the achievement of 'Higher-Order Thinking' in class, which helps build up on the students' knowledge and skill set through the process of analysis, creativity and evaluation. (Prince, 2004) The author believes that it is important for the educator to inform and create awareness among their students who are pursuing a teaching

career, of the importance of Physical Education; from the philosophical aspect of the teachings to the purpose of the activities of the past and present. For the purposes of this paper, the author enlisted students from the Faculty of Education who were interested in teaching Physical Education at kindergarten and elementary level to carry out the experimental activities. The activities were based on traditional Thai folk games and sports in order to promote cultural awareness among the kindergarten and elementary students as it was the wish of the author to inspire a passion for traditional Thai recreational activities. For the activities, equipment was provided in order to facilitate active learning for the students.

Research Objectives

There were two objectives:

1. To study the components and develop the physical education instructional model based on active learning with video model to promote teaching skill and personal awareness of teaching Thai traditional sports for student teachers

2. To study the results of the physical education instructional model based on active learning with video model to promote teaching skill and personal awareness of teaching Thai traditional sports for student teachers

Literature Review

From related literary sources, it was found that professional educators apply 9 different steps to make each lesson run smoothly. These include 1) a clear introduction of the lesson 2) concise explanation of content 3) elicitation of student response 4) encouragement 5) a clear lesson summary 6) holding attention 7) using the board 8) stimulating thought 9) using teaching materials (Kaewurai, 2006; Khammani, 2017)

A modern prototype educational video spread to the masses could help elevate the level of education and allow for more efficient communication between teacher and student, improving the teaching of trainee teachers as they get to learn through observations of themselves and of professional teachers. (Bellini and Akullian, 2007)

Proactive learning (Active Learning), where the educator provides the learning environment and motivation for learning is a process in which the learner has more meaningful interaction in the learning process. It allows the educator to take a step back and let the students demonstrate their enthusiasm for the activities provided by the educator; whether they shall be written assignments or verbal discussions. (Lorenzen, 2011; Phrutthikun, 2012; Tantiwachiratrakun, 2016)

It is important to ingrain a sense of awareness within the learner in order for them to see the importance of, and to entice them into learning, any given topic. Once

this awareness has been planted in the mind of the learner, they will demonstrate a willingness in their behavior to accept and act upon new information. (Watcharathamrongkul, 2009; Thanacharoenpisan & Phobun, 2012)

Moreover, from literature reviews of traditional Thai sports, it can be concluded that each traditional Thai recreational activity is a piece of cultural heritage passed on through each generation. They may differ in certain aspects and nuances but they are uniquely Thai. (Posakritsana & Amornvivat, 2004; Komaratat, 2006; Laochokchaikul and et.al., 2012)

From the aforementioned information, it is within the author's interest to pursue a path of study into the use of proactive learning coupled with the use of video media. In order to develop teaching skills of trainee teachers and promote awareness of traditional Thai recreational activities among young learners. It is the author's hope that the created video media for this study will be further use to future trainee teachers and the public. The conceptual framework for this research will be as the following

Conceptual Framework

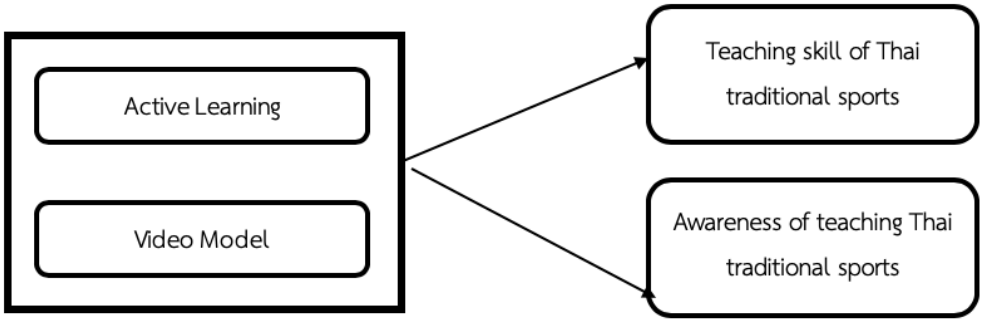

Figure 1: Conceptual Framework

Research Instrument

This research and development aims to develop the model, study the use of it and then propose the model to the public. The samples of this research were 60 students from Faculty of Education, Chulalongkorn University who attended the 2723319 subject, Child Movement Activity of Health and Physical Education Curriculum. They were divided into a control group and an experimental group, 30 students each, by using simple random sampling technique. There were 4 stages in this research as follows;

Stage 1: Studying components and procedures of Physical Education instructional based on active learning with video model to promote teaching skill and personal awareness of teaching Thai traditional sports for student teachers

Stage 2: Developing the Physical Education Instructional Model based on active learning with video model to promote teaching skill and personal awareness of teaching Thai traditional sports for student teachers. Components and procedures of this Physical Education Instructional Model and lesson plans were examined by 5 specialists in active learning with video model pedagogy, teaching skills and awareness of Thai traditional sports with at least 2 years-experience or/and a person who has academic work in active learning with video model to promote teaching skill and personal awareness of teaching Thai traditional sports for student teachers. The research instruments in this stage were as follows;

- Video model: The researcher developed the video model. Then, the specialists examined in IOC scale with the averages score was which means that the video model was appropriate to use.

- Lesson plan: The researcher created the lesson plan. Then, the specialists examined in IOC scale with the averages score which means that the lesson plan was appropriate to use.

- Teaching skill evaluation form: The evaluation form is a rating scale with 5 scales. This form included 1) Set Induction 2) Presentation 3) Question 4) Reinforcement 5) Set Closure 6) Stimulation 7) Chalk board writing skill 8) Active Thinking and 9) Media Presentation Skill. The teaching skill evaluation form has Cronbach's alpha at .96.

- Awareness assessment form: The awareness assessment form is a rating scale with 5 scales with Cronbach's alpha at .91.

-Student's behavior observation form: Student's behavior observation form was used to observe student's behavior along with the activity plan. Student's behavior observation form is a rating scale with 4 scales i.e. excellent, good, fair, and fail.

- The questionnaire on using the developed model: The questionnaire is a rating scale with 5 scales i.e. strongly agree, mostly agree, agree, disagree, strongly disagree.

Stage 3: Studying the result of using Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers was conducted by the Pretest – Posttest Control Group Design, the student teachers in the experimental group used the video model in their lesson while the student teachers in the control group was used the normal method. After that, the data was analyzed and summed up by using the research instruments which were developed in the second stage. Then reported the result.

Stage 4: The propose of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness

of Teaching Thai Traditional Sport for Student Teachers. In this stage, the researcher remodeled, modified and summarized the Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers. After that, the 5 experts approved the Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers, and then, proposed model to online network.
The research instrument in this stage was the approval form of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers.

Population

The target population of this study was 60 students from Faculty of Education, Chulalongkorn University,
who attended the 2723319 subject, Child Movement Activity of Health and Physical Education Curriculum.

Findings

The findings were divided into 3 parts.
Part 1: Teaching components and procedures.

Teaching components of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers are comprised with 5 components.

Component 1: Basic Knowledge
Component 2: Teachers' and Student Teachers' roles
Component 3: Active Learning activities
Component 4: Video Model
Component 5: Evaluation

Procedures of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sport for Student Teachers are comprised of 7 steps.

Step 1: Preparation
Step 2: Inquiry Process
Step 3: Active Learning for Movement
Step 4: Micro Teaching

Step 5: Video Model
Step 6: Knowledge Sharing
Step 7: Dissemination to Public

Part 2: The result of using Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers.

In this part, researcher collected date in teaching skill, the awareness of teaching Thai traditional sports and the opinion of the developed model by using teaching skill evaluation form, awareness assessment form, student's behavior observation form and the questionnaire on using developed model.

Part 2.1: Teaching skill, it was found that the student teachers in the experimental group that used Physical Education Instructional Model Based on Active Learning with Video Model earned the higher teaching skill than those in the control group at .05 level of significance shown as the following table.

Table 1: The mean and S.D. posttest score of teaching skill of control group and experiment group

Teaching Skill	**Experimental group (n = 30)**		**Control group (n = 30)**		**Sig.**
	Mean	**S.D.**	**Mean**	**S.D.**	
1. Set Induction	3.83	0.53	3.77	0.57	.64
2. Presentation	3.20	0.48	2.77	0.43	.00*
3. Question	4.00	0.00	3.03	0.72	.00*
4. Reinforcement	3.20	0.48	2.77	0.43	.00*
5. Set Closure	4.80	0.41	4.47	1.14	0.14
6. Stimulation	4.00	0.00	3.10	0.66	.00*
7. Chalk board writing skill	3.20	0.41	2.27	0.45	.00*
8. Active learning	3.13	0.57	2.77	0.43	.01*
9. Media Presentation	4.00	0.00	2.53	.90	.00*
Total	**3.71**	**0.13**	**3.05**	**0.53**	**.00***

*p < .05

Part 2.2: The awareness of teaching Thai traditional sport, the finding of awareness of teaching Thai traditional sports revealed that the experimental group that used Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional

Sports for Student Teachers had higher awareness than the control group learned with the normal learning model.

Table 2: The mean and S.D. posttest score of Awareness of control group and experiment group

Awareness	Experimental group (n=30)		Control group (n=30)		Sig.
	$\bar{x}$	S.D	$\bar{x}$	S.D	
1. Knowledge	4.42	0.41	4.01	0.73	0.01*
2. Mental	4.41	0.46	4.14	0.64	0.06
3. Behavior	4.48	0.40	4.07	0.64	0.00*
Total	**4.44**	**0.35**	**4.07**	**0.62**	**0.01***

Part 3: The from proposing the Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers**.**

After using Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers, the model got approval from 5 experts. The results revealed that the procedure of the model was the most appropriate with the highest score for the seventh step: dissemination to the public.

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Discussion

1. Teaching components and procedures of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers.

1.1. Teaching components of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers were 1) Basic Knowledge, 2) Teachers' and Student Teachers' roles, 3) Active Learning activities, 4) Video Model, and 5) Evaluation

1.2 Procedures of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers were 1) Preparation, 2) Inquiry Process, 3) Active Learning for Movement, 4) Micro Teaching, 5) Video Model, 6) Knowledge Sharing, and 7) Dissemination to Public

The discussion on developing components and procedures of Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of Teaching Thai Traditional Sports for Student Teachers were revealed as the following table.

Table 3 The relationship between teaching procedures effecting on teaching skill and active learning approach

Teaching Procedures	**Teaching Skill**	**Active Learning Approach**
Step 1: Preparation	1. Explanation Skill 2. Conclusion Skill	Teachers provide learning activity that encourages students to analyze the particular problem based on their background knowledge along with researching for the new then finally draw conclusion together.
Step 2: Inquiry Process	1. Explanation Skill 2. Questioning Skill 3. Encouraging to Think Skill 4. Conclusion Skill	Teachers provide learning activity that encourages students to construct their own understanding by gathering meaningful information, verify, interpret, and finally conclude their own learning knowledge.
Step 3: Active Learning for Movement	1. Induction Skill 2. Explanation Skill 3. Questioning Skill 4. Reinforcement Skill 5. Conclusion Skill 6. Stimulation Skill 7. Chalk Board Writing Skill 8. Encouraging to Think Skill 9. Media Presentation Skill	Collaborative learning is the key to active learning. Therefore students are provided with group work so they can share the ideas and have the same goal and the interaction among them is positively focused.

Step 4: Micro Teaching	1. Induction Skill 2. Explanation Skill 3. Questioning Skill 4. Reinforcement Skill 5. Conclusion Skill 6. Stimulation Skill 7. Chalk Board Writing Skill 8. Encouraging to Think Skill 9. Media Presentation Skill	As active learning focuses on learning by doing, so this allows all students to participate in every step of learning activity with positive and enthusiastic cooperation.
Step 5: Video Model	1. Induction Skill 2. Explanation Skill 3. Stimulation Skill 4. Encouraging to Think Skill 5. Media Presentation Skill 6. Conclusion Skill	Teachers use the video clips to arouse and motivate students.Then the student will discuss on the target topic leading to learning outcome.
Step 6: Knowledge Sharing	1. Explanation Skill 2. Questioning Skill 3. Conclusion Skill 4. Chalk Board Writing Skill 5. Encouraging to Think Skill	Teachers provide an active learning activity, Think-Pair-Share, which students have opportunity to share the idea, knowledge, and opinion with others. Then teachers give the feedback on assignment or task to the students.
Step 7: Dissemination to Public	1. Explanation Skill 2. Conclusion Skill 3. Media Presentation Skill	Collaborative learning, teamwork, and participation are key to success in active learning. Through provided lesson, student teachers always work together in small groups so they can share the same goal and finally achieve it with positive interaction among them.

As the student teachers enrolled in this research earned the highest score for conclusion skill, this can ensure that all the seven steps are leading to it.

2. The result of using Physical Education Instructional Model Based on Active Learning with Video Model to Promote Teaching Skill and Personal Awareness of

Teaching Thai Traditional Sports for Student Teachers.
According to the research result, after the implementation of the active learning with video model, the student teachers had awareness score higher than one before the implementation at .05 level of significance. This can be inferred that the active learning as a learner-centered itself possesses the strong influence in student teachers' learning outcome. All learning activities provided in the study focused on the needs of the student teachers, so they can generate knowledge, skill, and experience into daily life. It was also found that the open-mind teachers could encourage the student teachers' learning potential such as participation with confidence and collaboration among classmates.

By blending the advantage of active learning with the video model, it could help teachers to deliver the lesson easily. The teachers could show both motion clips and slides or pause to draws learners' attention. On the other hand the learners could also use the slow motion mode, ask for particular slides, play forward, or whatever to interact with this learning media (Waiin, 2012) Addressed finding was related to the study of Prasopkittikun (1999) revealing that individual's awareness was influenced by what he perceived or experienced along with his interest, period of time and frequency. The more he perceives the more he gains awareness. This can explain why both control and experimental group had the same level of awareness in affective domain at .05 level of significance since the period of implementation might not be long enough to foster the affection of the student teachers.

Since the experimental group had the higher score of teaching skill and awareness than the control group, this reflected the advantage of blending active learning with video model into lesson. Those in the experimental group could be able to choose the appropriate teaching strategy for their lessons because they normally perceived the best practices of teaching and learning through the video model. This fining strongly agreed with Kaewsanga, Pakkothanang & Khenkhok's study addressed that learning with multimedia could enhance learning competence at high level. He also strongly recommended that use of multimedia in every classroom. (Kaewsanga, Pakkothanang, & Khenkhok, 2008)

Recommendation

1. How to utilize the finding results

1.1 To utilize the video model in the classroom, teachers should be skilled in using multimedia from taping, illustrating, and publishing. They should also be able to generate the idea and help their student teachers if needed.

1.2 Before assigning the student teachers to surf the Internet for finding target content, teachers should give them some guideline and be at present when they call

for your recommendation or advice. As it was found that most student teachers still have limitation on selecting the most useful online content. So it is the role of experienced teachers to be their mentor.

1.3 During the discussion, the teachers should play the role of supporter who give advice and raise questions encouraging the student teachers' thinking skills.

2. Recommendation for further study

2.1 As the result stated that both samples in the control and experimental group had the same awareness score at .05 level of significance since the period of implementation might not be long enough to foster the awareness of those in experimental group. Therefore the longer period of implementation is recommended in the future study.

2.2 According to the variety of educational disciplines they were from, student teachers enrolled in this study had different background especially interest in tradition Thai recreational sports which was precisely various and played massive role in class. Selecting target samples who have to utilize this model in their career is recommended.

References

Bellini, S. & Akullian, J. (2007). A Meta-Analysis of Video Modeling and Video Self-Modeling Interventions for Children and Adolescents With Autism Spectrum Disorders. *Council for Exceptional Children* 73 (3): 264–287.

Besler, F. & Kurt, O. (2016). Effectiveness of Video Modeling Provided by Mothers in Teaching Play Skills to Children with Autism. *Educational Sciences: Theory & Practice* 16 (February 2016): 209-230.

Kaewsanga, C., Pakkothanang, P. & Khenkhok, K. (2008). The Construction of Multimedia Sculpture (Ceramic) by Slip cast Form for Self-Access Learning. *Journal of Education Khon Kaen University* 34 (3 – 4): 97 – 107.

Komaratat, C. (2006). *North Thai Folk Play Wisdoms*. Bangkok: Satapornbooks.

Komaratat, C. (2006). *Northeast Thai Folk Play Wisdoms*. Bangkok: Satapornbooks.

Komaratat, C. (2006). *South Thai Folk Play Wisdoms*. Bangkok: Satapornbooks.

Komaratat, C. (2006). *Central Thai Folk Play Wisdoms*. Bangkok: Satapornbooks.

Costa, N., Marques, M., a Kempa, R. (2010). Science Teachers' Awareness of Findings from Education Research. *Research in Science & Technological Education* 18 (August 2010): 37 - 44

Thanacharoenpisan, E. & Phobun, C. (2012). Personnel's Awareness and Acceptance on Implementation of Environmental Management System (ISO 14001) in Public Organization: a Case Study of Office of Natural Resources and Environmental Policy and Planning. *Journal of the Association of Researchers* 17 (January – April): 42 – 54.

Madteh, F. (2014). *Effects of Traditional Games Training on Early Childhood Development*. Master's Thesis, Department of Curriculum and Instruction, Prince of Songkla University.

Grabinger, R. S. & Dunlap, J.C. (1998). Rich Environments for Active Learning: a Definition. *ALT-J Association for Learning Technology journal* 3 (October 1998): 1-27

Laochokchaikul, K. & et.al. (2012). *Thai Folk Culture*. Bangkok: Sukhothai Thammathirat Open University.

Killian, M. & Batas, H. (2015). The Effects of an Active Learning Strategy on Students' Attitude and Students' Performances in Introductory Sociology Classes. *Journal of the Scholarship of Teaching and Learning* 15 (June 2015): 53-67.

Watcharathamrongkul, K. (2009). *A Construction of a Test on Global Warming Effect Awareness for The Forth-Level Students in Bangkok Education Office Area 1*. Master's Thesis. Department of Educational Measurement, Srinakharinwirot University.

Saksri, K. (1987). *Educational Psychology*. Bangkok: Niyomvitthaya.

Lorenzen, M. (2001). Active Learning and Library Instruction. *Illinois Libraries* 83(2) (Spring 2001): 19-24.

Mason, R., Rispoli, M., Ganz, J., Boles, M., & Orr, K. (2012). Effects of video modeling on communicative social skills of college students with asperger syndrome. *Developmental Neurorehabilitation* 15 (October 2012): 425-434.

Niemia, H. & Nevgib, A. (2014). Research studies and active learning promoting professional competences in Finnish teacher education. *Teaching and Teacher Education* 43 (October 2014): 131-142.

Songkram, N. (2012). *The Development of Blended Learning Model with ActiveLearning for Knowledge Construction and Creative Problem Solving Ability for Undergraduate Students*. Research article. Faculty of Education, Chulalongkorn University.

Ruengpanyawut, P. (2013). *Effects of Physical Education Learning Management using Thai Folk Games on Health-Related Physical Fitness of Elementary School Students*. Master's Thesis, Department of Curriculum and Instruction, Faculty of Education, Chulalongkorn University.

Somnuek, P. (2015). The Development of Teaching and Learning Innovation by Using Instructional Media for Enhancement of Learning Achievement towards Tourism Product.

Journal of International and Thai Tourism. 11(1): 4 – 17.

Tantiwachiratrakun, P. (2016). *Multi-Label Classification Using Active Learning on Large Scale and Imbalanced Data Sets*. Master's Thesis, Department of Computer Engineering, Faculty of Engineering, Chulalongkorn University.

Posakritsana, P. & Amornvivat, S. (2004). Thai Play. *Thai Encyclopedia for Children* 13. [online]. Available from: http://kanchanapisek.or.th/kp6/sub/book/book.php?book=13&chap=7&page=chap7.htm [6 January 2018]

Waiin, P. (2012). *Multimedia Technology*. [Online]. Available from: https://krupiyadanai.wordpress.com/computer4/%E0%B9%80%E0%B8%97%E0%B8%84%E0%B9%82%E0%B8%99%E0%B9%82%E0%B8%A5%E0%B8%A2%E0%B8%B5%E0 [25 December 2018]

Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education* 93 (3): 223-231.

Raenoo Rungphan, R. (2010). *Nurses' Awareness and Practice on Pressure Ulcer Prevention for Hospitalized Patients*. Master's Thesis, Department of Nursing Science (Adult Nursing), Prince of Songkla University.

Tumchat, R. (2008). *The Study of Awareness of Science and Technology Impact on Environment Problem of Mathayomsuksa 3 Students in Samutsakhon Using Lisrel Model: Multiple Group Analysis*. . Master's Thesis, Department of Educational Measurement, Srinakharinwirot University.

Sukhonthapattima, R. (2010). *Development of Multimedia Lessons on Teaching Skills for Graduate Education Students*. Master's Thesis, Department of Educational Technology and Communications, Chandrakasem Rajabhat University.

Phrutthikun, S. (2012). Quality of Students Derived From Active Learning Process. *Journal of Educational Administration Burapha University* 6 (2) (April – September 2012): 1 – 13.

Prasopkittikun, T. (1999). *Assessing Awareness of Environmental Problems of Mathayomsuksa 3 Students in Changwat Trat*. Master's Thesis, Department of Science Education, Kasetsart University.

Khammani, T. (2017). *Teaching Model: Knowledge to organize effective learning processes*. Bangkok: Chulalongkorn University Press.

Kaewurai, W. (1998). *The Development of the Instructional Model for General Methods of Teaching Subject Emphasizing Cases to Enhance Teacher students' Reflective Thinking Ability in the Science of Teaching*. Doctoral Dissertation, Department of Curriculum and Instruction, Faculty of Education, Chulalongkorn University.

Kaewurai, W. (2006). *Teaching Skills*. [Online]. Available from: http://www.oocities.org/ya_bah/ instruction. pdf [21 December 2018]